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and submit a copy to the contractor. This report must include a detailed description of the methods of conducting the test(s), observed data, comparison of guaranteed and actual performance, and recommendations concerning acceptance. The borrower will obtain from the engineer a written certification stating that the equipment has been installed, placed in satisfactory operation and tested, and meets the contract requirements. Where more than one-hundred and eighty (180) days have elapsed since the delivery of the equipment and the equipment has not been installed or tested, the contract may be closed out upon certification by the engineer that the equipment has been inspected and appears to be in accordance with the contract requirements.

(b) *Final inspection of construction.* The borrower will require the contractor to notify its engineer when construction of a section of the project is complete. The borrower (acting through its engineer, if applicable) will schedule such final inspection at a time mutually agreeable to the borrower, its engineer, contractor, and the respective GFR, if the GFR has notified the borrower or its engineer of a desire to observe the final inspection. The borrower (acting through its engineer, if applicable) will perform a final inspection of the construction of that section of the project and notify the contractor of any required changes or corrections.

(c) *Closeout documents.* (1) Upon satisfactory completion of construction of a section of the project (including all changes and corrections by the contractor), the borrower (acting through its engineer, if applicable) will obtain executed copies of the following documents:

(i) RUS Form 792b, Certificate of Contractor and Indemnity Agreement
(ii) RUS Form 213, "Buy American" certificate.

(iii) Certification by the project engineer in accordance with paragraph (a) of this section, if applicable.

(iv) Final design documents, as outlined in part 1724 of this chapter.

(2) *Distribution of closeout documents.*

(i) The borrower will retain one copy of each of the documents identified in

paragraph (c)(1) of this section in accordance with applicable RUS requirements regarding retention of records.

(ii) For contracts not subject to RUS approval, the closeout is not subject to RUS approval and the closeout documents need not be sent to RUS unless specifically requested by RUS.

[60 FR 10155, Feb. 23, 1995, as amended at 69 FR 7111, Feb. 13, 2004]

§ 1726.405 Inventory of work orders (RUS Form 219).

Upon completion of the contract closeout, the borrower shall complete RUS Form 219, Inventory of Work Orders, in accordance with part 1717, Post-Loan Policies and Procedures Common to Insured and Guaranteed Electric Loans, of this chapter.

PART 1728—ELECTRIC STANDARDS AND SPECIFICATIONS FOR MATERIALS AND CONSTRUCTION

Sec.

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1728.203 Inspector's qualifications.

1728.204 Electric standards and specifications for materials and construction.

AUTHORITY: 7 U.S.C. 901 *et seq.*, 1921 *et seq.*, 6941 *et seq.*

SOURCE: 48 FR 31853, July 12, 1983, unless otherwise noted. Redesignated at 55 FR 39395, Sept. 27, 1990.

§ 1728.10 General purpose and scope.

(a) The requirements of this part are based on contractual provisions between RUS and the organizations

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which receive financial assistance from RUS.

(b) RUS will establish certain specifications and standards for materials, equipment, and construction units that will be acceptable for RUS financial assistance for the electric program. Materials and equipment purchased by the electric borrowers or accepted as contractor-furnished material must conform to RUS standards and specifications where they have been established and, if included in RUS Bulletin 43-5, "List of Materials Acceptable for Use on Systems of RUS Electrification Borrowers" (List of Materials), must be selected from that list or must have received technical acceptance from RUS. RUS, through its Technical Standards Committees, will evaluate certain materials, equipment and construction units, and will determine acceptance.

[50 FR 47710, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.20 Establishment of standards and specifications.

(a) *National and other standards.* RUS will utilize standards of national standardizing groups, such as the American National Standards Institute (ANSI), American Wood Preservers' Association (AWPA), the various national engineering societies and the National Electrical Safety Code (NESC), to the greatest extent practical. When there are no national standards or when RUS determines that the existing national standards are not adequate for rural electric systems, RUS will prepare standards for material and equipment to be used on systems of electric borrowers. RUS standards and specifications will be codified or listed in § 1728.97, Incorporation by Reference of Electric Standards and Specifications. RUS will also prepare specifications for materials and equipment when it determines that such specifications will result in reduced costs, improved materials and equipment, or in the more effective use of engineering services.

(b) *Deviations from Standards.* No member of the RUS staff will be permitted to authorize deviations from the standard specifications, or to establish or change the technical standards, or to authorize the use of items that have not received acceptance by

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the Technical Standards Committees, except as provided for under § 1728.70, or by authorization and/or delegation of authority by the Administrator of RUS.

(c) *Category of Items.* Items appearing in the List of Materials are listed by categories of generic items which are used in RUS construction standards incorporated by reference in § 1728.97. RUS will establish and define these categories and will establish all criteria for acceptability within these categories.

[50 FR 47710, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990, as amended at 55 FR 53487, Dec. 31, 1990]

§ 1728.30 Inclusion of an item for listing or technical acceptance.

(a) *Scope.* RUS, through its Technical Standards Committees "A" and "B" will determine the acceptability of certain standards, standard specifications, standard drawings, and items of materials and equipment to be used in transmission, distribution and general plant (excluding office equipment, tools, and work equipment, and consumer-owned electric wiring facilities).

(b) *Addresses of Committees.* The address of Technical Standards Committee "A" is: Chairman, Technical Standards Committee "A" (Electric), Rural Utilities Service, U.S. Department of Agriculture, Washington, DC 20250-1500. The address of Technical Standards Committee "B" is: Chairman, Technical Standards Committee "B" (Electric), Rural Utilities Service, U.S. Department of Agriculture, Washington, DC 20250-1500.

(c) *Review by Technical Standards Committee "A".* All proposals for listing a product in the List of Materials must be addressed to Technical Standards Committee "A." This committee will consider all proposals made by sponsors of specifications, drawings, materials, or equipment in categories for which RUS has established criteria for acceptability. A sponsor may be a manufacturer, supplier, contractor or any other person or organization which has made an application for listing or has requested an action by the committee.

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Committee "A" will consider all relevant information presented in determining whether an item should be accepted by Technical Standards Committee "A." Formal rules of evidence and procedure shall not apply to proceedings before this committee.

(d) *Action by Technical Standards Committee "A"*. (1) Committee "A" may take one of the following actions:

(i) Accept an item for listing without conditions (domestic items only),

(ii) Reject an item (domestic or non-domestic),¹

(iii) Accept an item for listing with conditions (domestic items only),

(iv) Table an item for a time period sufficient to allow the sponsor to be notified and furnish additional information (domestic or nondomestic),

(v) Grant technical acceptance with or without conditions for a period of one year from the date of notification by RUS (nondomestic items only).

(2) All committee decisions regarding the actions listed above must be unanimous. If the vote is not unanimous, the item shall be referred to Technical Standards Committee "B." Written notice of Technical Standards Committee "A's" decision, stating the basis for the decision, will be provided to the sponsor.

(3) Items accepted without conditions by the Technical Standards Committees will be considered to be accepted on a general basis. No restrictions as to quantity or application will be placed on items which have received general acceptance. Items accepted subject to certain conditions, such as limited use to gain service experience, or limited use appropriate to certain areas and conditions, will be considered to be accepted on a conditional basis. The conditions will be cited as a part of the listing provided for in §1728.60, or as part of the technical acceptance for nondomestic items.

(e) *Appeal to Technical Standards Committee "B"*. A sponsor may request a review of an adverse decision by Technical Standards Committee "A" within ten (10) days of notification of such decision by submitting a letter request-

ing such review to Technical Standards Committee "B" (Electric).

(f) *Action by Technical Standards Committee "B"*. Committee "B" may take any of the actions listed for Committee "A" in §1728.30(d). However, for a Committee "B" action to be effective it must be by majority vote. Failure to obtain a majority on one of the proposed actions shall mean that the product will not be listed or accepted. Committee "B's" determination shall be based on the record developed before Committee "A" and such additional information as Committee "B" may request. Formal rules of procedure and evidence shall not apply to proceedings before Committee "B." Written notice of Committee "B's" decision, stating the basis of the decision, will be provided to the sponsor.

(g) *Appeal to the Administrator*. In the event of an adverse decision by Committee "B," the sponsor may, within ten (10) days of notification of such decision, request a review of this decision by submitting a letter to the Administrator requesting such a review.

(h) *Change in Design*. RUS acceptance of an item will be conditioned on the understanding that no design changes (material or dimensions) affecting the quality, strength, or electrical characteristics of the item shall be made without prior concurrence of Technical Standards Committee "A."

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.40 Procedure for submission of a proposal.

(a) *Written Request*. Consideration of an item of material or equipment will be obtained by the sponsor through the submission of a written request in an original and five copies addressed to the Chairman, Technical Standards Committee "A" (Electric). The letter must include the catalog number or other identifying number or code as well as a description of the item. In the event that an item being submitted is also intended for consideration by Technical Standards Committee "A" (Telephone), a separate request must be made to the telephone committee. (See part 1755 of this chapter).

¹Nondomestic items are items which do not qualify as domestic products pursuant to RUS "Buy American" requirement.

(b) *Technical and Performance Data.* Six copies of the specification of manufacture, drawings and test data must be submitted to the committee. Six copies of the performance history shall also be submitted unless RUS determines that such performance history is not reasonably available.

(c) *Sample.* One sample of the item must be submitted to the Chairman, Technical Standards Committee "A," unless RUS waives the requirements of the sample. In case of large, bulky or extremely heavy samples, the sponsor should contact the Chairman, Technical Standards Committee "A" (Electric), at the above address, before any sample is shipped.

(d) *Action on Proposal.* RUS will inform a sponsor of the action taken on the sponsor's proposal.

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.50 Removal of an item from listing or technical acceptance.

(a) *Removal Actions.* An item of material or equipment may be removed from the listing or technical acceptance in accordance with the following procedures upon determination that the item is unsatisfactory or has been misrepresented to the owner or RUS.

(b) *Notification by the Committee.* The sponsor of an item of material or equipment will be notified in writing of a proposal to remove such item from the listing or technical acceptance.

(c) *Supplemental Information.* Within ten (10) days of receipt of such notification, the sponsor may submit to Committee "A" a letter expressing the sponsor's intent to submit written supplemental technical information relevant to Committee "A's" determination. The sponsor must submit such information within twenty (20) days from the submission of its letter to Committee "A." Committee "A" will have the discretion of making a decision following the expiration of the time periods provided in this paragraph.

(d) *Review by the Technical Standards Committee "A".* Committee "A" will consider all relevant information presented in determining whether an item should be removed from the listing or technical acceptance. Formal rules of evidence and procedure shall not apply

to proceedings before Technical Standards Committee "A."

(e) *Action by the Technical Standards Committee "A".* Committee "A" may take one of the following actions:

(1) Order the immediate removal of the item from the listing, or technical acceptance,

(2) Condition the item's continued listing, or technical acceptance,

(3) Recommend a basis of settlement which will adequately protect the interest of the Government, or

(4) Delay the effectiveness of its decision for a time period sufficient to allow the sponsor to appeal to Technical Standards Committee "B."

All committee "A" decisions regarding the actions listed above must be by unanimous vote. If the vote is not unanimous, the item will be referred to Technical Standards Committee "B."

Written notice of Technical Standards Committee "A's" decision, stating the basis for the decision, will be provided to the sponsor.

(f) *Additional Opportunity to Present Information.* At the request of the sponsor, RUS may afford additional opportunity for consideration of relevant information. Such additional opportunity may include, without limitation, a meeting between RUS and the sponsor in such a forum that RUS may determine. In making this decision, RUS will consider, among other things, the best interests of RUS, its borrowers, and the sponsor, and the best manner to develop sufficient information relating to the proposed action.

(g) *Appeal to the Technical Standards Committee "B".* Within ten (10) days of notification of Committee "A's" decision, a sponsor may appeal in writing to Technical Standards Committee "B" to review Committee "A's" decision, specifying the reasons for such a request. Committee "B's" determination, in response to such request, shall be based on the record developed before Committee "A" and such additional information as Committee "B" may request. Formal rules of procedure and evidence shall not apply to proceedings before Committee "B."

(h) *Action by Technical Standards Committee "B".* Committee "B," by majority vote, may take one of the following actions:

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(1) Order the immediate removal of the item from listing, or technical acceptance,

(2) Condition the item's continued listing, or technical acceptance,

(3) Recommend a basis of settlement which adequately protects the interests of the Government, or

(4) Delay the effectiveness of its decision for a time period sufficient to allow the sponsor to appeal to the Administrator of RUS.

Failure to obtain a majority vote on any of the above actions shall mean that the product will continue to be listed or accepted.

Written notice of Committee "B's" decision stating the basis of the decision will be provided to the sponsor.

(i) *Appeal to the Administrator.* Within ten (10) days of the receipt of Committee "B's" decision, a sponsor may appeal to the Administrator to review Committee "B's" decision. If an appeal is made, the sponsor shall submit a written request to the Administrator, Rural Utilities Service, Room 4053, South Building, U.S. Department of Agriculture, Washington, DC 20250-1500 specifying the reasons to request reconsideration. The Administrator will have the option to decline the request, in which case the decision of Committee "B" shall stand. If a review is granted, the determination by the Administrator or the Administrator's designee shall be based on the record developed before Committee "A" and Committee "B" and such additional information as the Administrator may request. Formal rules of procedure and evidence shall not apply to the actions of the Administrator.

(j) *Action by the Administrator.* The Administrator may take one of the following actions:

(1) Order the immediate removal of the item from the listing, or technical acceptance,

(2) Condition its continued listing, or technical acceptance, or

(3) Recommend a basis of settlement which adequately protects the interests of the Government.

Written notice of the Administrator's determination, stating the basis for the decision, will be provided to the sponsor.

The Administrator's actions are final.

[50 FR 47711, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.60 List of materials and equipment.

(a) *General.* Those items of material or equipment accepted by Technical Standards Committee "A" or "B," with the exception of technically accepted nondomestic items, will be listed in the List of Materials. Items which do not qualify as domestic products may be accepted on a technical basis only (technical acceptance) for a period of one year as provided in § 1728.30(c)(1) and will not be included in the List of Materials.

(b) *Publishing and Revisions.* RUS will reissue the List of Materials every year, dated July, and issue supplements, if needed, dated October, January, and April of every year. An RUS office copy, which is the official current copy, of the List of Materials, will be updated every time changes are made by the Technical Standards Committees.

(c) *Dual Listings.* RUS, through its Technical Standards Committees, will accept for listing only one item of a particular type of material or equipment for each manufacturer. If a manufacturer submits an item to perform the identical function of a listed item, RUS, through its Technical Standards Committees, may accept that item and remove the one previously listed. RUS will list only new items of material and equipment in the List of Materials. Used items will not be considered for listing.

[50 FR 47712, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.70 Procurement of materials.

(a) *By Owner.* When purchasing the type of materials included in the List of Materials, RUS borrowers shall purchase only materials listed in the List of Materials, or materials which have a current technical acceptance by RUS and meet the "Buy American" requirement.

(b) *By Contractor.* When performing work for an RUS borrower, contractors shall supply only items from the general acceptance pages of the List of Materials, or obtain the borrower's

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concurrence prior to purchase and use of a technically nondomestic item or any item listed on a conditional basis.

(c) *Procurement of Unlisted Items.* (1) The borrower shall request prior approval from RUS for use of an item that does not fall in categories established by RUS in the List of Materials for which acceptability has been established by the Technical Standards Committees.

(2) RUS will also determine, on a case-by-case basis, whether to allow use of an unlisted item in emergency situations and for experimental use or to meet a specific need. For purposes of this part 1728, an emergency shall mean a situation wherein the supply of listed material and equipment from the industry is not readily available, or the standard designs are not applicable to the borrower's specific problem under consideration.

(3) RUS will make arrangements for test or experimental use of newly developed items requiring limited trial use. RUS, working with the borrower and the manufacturer, will establish test locations for the items to facilitate installation and observation.

[50 FR 47712, Nov. 20, 1985. Redesignated at 55 FR 39395, Sept. 27, 1990]

§ 1728.97 Incorporation by reference of electric standards and specifications.

Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Rural Utilities Service, U.S. Department of Agriculture, Room 5170-S, Washington, DC 20250-1522, call (202) 720-8674 and is available from the sources listed in this section. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030 or go to www.archives.gov/federal-register/cfr/ibr-locations.html.

(a) Rural Utilities Service, U.S. Department of Agriculture, Room 5170-S-S, U.S. Department of Agriculture, Washington, DC 20250. For information on the availability of this material, call (202) 720-8674 or go to: <https://>

www.rd.usda.gov/publications/regulations-guidelines/bulletins.

(1) Bulletin 50-4 (D-801), Specification and Drawings for 34.5/19.9 kV Distribution Line Construction (11-86), incorporation approved for § 1728.98.

(2) Bulletin 50-15 (DT-3), RUS Specifications for Pole Top Pins with 1½" Diameter Lead Thread (1-51), incorporation approved for § 1728.98.

(3) Bulletin 50-16 (DT-4), RUS Specifications for Angle Suspension Brackets (3-52), incorporation approved for § 1728.98.

(4) Bulletin 50-19 (DT-7), RUS Specifications for Clevis Bolts (8-53), incorporation approved for § 1728.98.

(5) Bulletin 50-23 (DT-18), RUS Specifications for 60" Wood Crossarm Braces (2-71), incorporation approved for § 1728.98.

(6) Bulletin 50-31 (D-3), RUS Specifications for Pole Top Pins with 1" Diameter Lead Threads (2-79), incorporation approved for § 1728.98.

(7) Bulletin 50-32 (D-4), RUS Specifications for Steel Crossarm Mounted Pins with 1" Diameter Lead Threads (10-50), incorporation approved for § 1728.98.

(8) Bulletin 50-33 (D-5), RUS Specifications for Single and Double Upset Spool Bolts (2-51), incorporation approved for § 1728.98.

(9) Bulletin 50-34 (D-6), RUS Specifications for Secondary Swinging Clevises (12-70), incorporation approved for § 1728.98.

(10) Bulletin 50-35 (D-7), RUS Specifications for Service Swinging Clevises (9-52), incorporation approved for § 1728.98.

(11) Bulletin 50-36 (D-8), RUS Specifications for Service Deadend Clevises (9-52), incorporation approved for § 1728.98.

(12) Bulletin 50-40 (D-14), RUS Specifications for Pole Top Brackets for Channel Type Pins (9-51), incorporation approved for § 1728.98.

(13) Bulletin 50-41 (D-15), RUS Specifications for Service Wireholders (11-51), incorporation approved for § 1728.98.

(14) Bulletin 50-55 (T-2), RUS Specifications for Overhead Ground Wire Support Brackets (5-53), incorporation approved for § 1728.98.

(15) Bulletin 50-56 (T-3), RUS Specifications for Steel Plate Anchors for

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Transmission Lines (12-53), incorporation approved for § 1728.98.

(16) Bulletin 50-60 (T-9), RUS Specification—Single Pole Steel Structures, Complete with Arms (12-71), incorporation approved for § 1728.98.

(17) Bulletin 50-72 (U-4), RUS Specification for Electrical Equipment Enclosures (5-35 kV) (10-79), incorporation approved for § 1728.98.

(18) Bulletin 50-73 (U-5), RUS Specifications for Pad-Mounted Transformers (Single and Three-Phase) (1-77), incorporation approved for § 1728.98.

(19) Bulletin 50-74 (U-6), RUS Specification for Secondary Pedestals (600 Volts and Below) (10-79), incorporation approved for § 1728.98.

(20) Bulletin 50-91 (S-3), RUS Specifications for Step-Down Distribution Substation Transformers (34.4-138 kV) (1-78), incorporation approved for § 1728.98.

(21) Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs (April 15, 2019), incorporation approved for §§ 1728.98 and 1728.202.

(22) Bulletin 1728F-803, Specifications and Drawings for 24.9/14.4 kV Line Construction (10-98), incorporation approved for § 1728.98.

(23) Bulletin 1728F-804 (D-804), Specification and Drawings for 12.47/7.2 kV Line Construction, October 2005, incorporation approved for § 1728.98.

(24) Bulletin 1728F-806 (D-806) Specifications and Drawings for Underground Electric Distribution, October 11, 2018, incorporation approved for § 1728.98.

(25) Bulletin 1728F-810, Electric Transmission Specifications and Drawings, 34.5 kV to 69 kV (3-98), incorporation approved for §§ 1728.98 and 1728.201.

(26) Bulletin 1728F-811, Electric Transmission Specifications and Drawings, 115 kV to 230 kV (3-98), incorporation approved for §§ 1728.98 and 1728.201.

(b) American Institute of Timber Construction (AITC), 7012 S Revere Park Way, Englewood, Colorado 80112, telephone (303) 792-9559, web address: <https://www.aitc-glulam.org/index.asp>.

(1) AITC 200-2009, Manufacturing Quality Control Systems Manual For Structural Glued Laminated Timber, copyright 2009, incorporation by reference approved for §§ 1728.201 and 1728.202.

(2) [Reserved]

(c) American National Standards Institute (ANSI), 25 West 43rd Street, New York, New York 10036, telephone (212) 642-4900, Web address: <http://www.ansi.org>.

(1) ANSI O5.2-2012, Structural Glued Laminated Timber for Utility Structures, approved May 9, 2012, incorporation by reference approved for §§ 1728.201 and 1728.202.

(2) ANSI O5.3-2015, Solid Sawn Wood Crossarms & Braces: Specifications & Dimensions, approved January 9, 2015, incorporation by reference approved for § 1728.201.

(d) ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Telephone: (610) 832-9585, website: www.astm.org.

(1) ASTM B 3-01 (Reapproved 2007)—Standard Specification for Soft or Annealed Copper Wire, (ASTM B 3-01) approved March 15, 2007, incorporated by reference approved for § 1728.204.

(2) ASTM B 8-04—Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft (ASTM B 8-04), approved April 1, 2004, incorporated by reference approved for § 1728.204.

(3) ASTM B 230/B 230M-07—Standard Specification for Aluminum 1350-H19 Wire for Electrical Purposes (ASTM B 230/B 230M-07), approved March 15, 2007, incorporated by reference approved for § 1728.204.

(4) ASTM B 231/B 231M-04—Standard Specification for Concentric-Lay-Stranded Aluminum 1350 Conductors (ASTM B 231/B 231M-04), approved April 1, 2004, incorporated by reference approved for § 1728.204.

(5) ASTM B 400-08—Standard Specification for Compact Round Concentric-Lay-Stranded Aluminum 1350 Conductors (ASTM B 400-08), approved September 1, 2008, incorporated by reference approved for § 1728.204.

(6) ASTM B 496-04—Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors (ASTM B 496-04), approved April 1, 2004, incorporated by reference approved for § 1728.204.

(7) ASTM B 609/B 609M-99—Standard Specification for Aluminum 1350 Round Wire, Annealed and Intermediate Temperatures, for Electrical Purposes (ASTM B

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609/B 609M–99), approved April 1, 2004, incorporated by reference approved for §1728.204.

(8) ASTM B 786–08—Standard Specification for 19 Wire Combination Unilay-Stranded Aluminum 1350 Conductors for Subsequent Insulation (ASTM B 786–08), approved September 1, 2008, incorporated by reference approved for §1728.204.

(9) ASTM B 787/B 787M–04—Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation (ASTM B 787/B 787M–04), approved September 1, 2004, incorporated by reference approved for §1728.204.

(10) ASTM B 835–04—Standard Specification for Compact Round Stranded Copper Conductors Using Single Input Wire Construction (ASTM B 835–04), approved September 1, 2004, incorporated by reference approved for §1728.204.

(11) ASTM B902–04a—Standard Specification for Compressed Round Stranded Copper Conductors, Hard, Medium-Hard, or Soft Using Single Input Wire Construction (ASTM B902–04a), approved September 1, 2004, incorporated by reference approved for §1728.204.

(12) ASTM D 1248–05—Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable (ASTM D 1248–05), approved March 1, 2005, incorporated by reference approved for §1728.204.

(13) ASTM D 2275–01 (Reapproved 2008)—Standard Test Method for Voltage Endurance of Solid Electrical Insulating Materials Subjected to Partial Discharges (Corona) on the Surface (ASTM D 2275–01), approved May 1, 2008, incorporated by reference approved for §1728.204.

(14) ASTM E 96/E 96M–05—Standard Test Methods for Water Vapor Transmission of Materials (ASTM E 96/E 96M–05), approved May 1, 2005, incorporated by reference approved for §1728.204.

(e) American Wood Protection Association (AWPA), P.O. Box 361784, Birmingham, AL 35236–1784, telephone 205–733–4077, <http://www.awpa.com/>.

(1) AWPA A6–15, Method for the Determination of Retention of Oil-Type Preservatives from Small Samples, Reaffirmed 2015, incorporation by reference approved for §1728.202.

(2) AWPA A9–18, Standard Method for Analysis of Treated Wood and Treating Solutions By X-Ray Spectroscopy, Revised 2018, incorporation by reference approved for §1728.202.

(3) AWPA A15–18, Referee Methods, Revised 2018, incorporation by reference approved for §1728.202.

(4) AWPA A83–18, Standard Method for Determination of Chloride for Calculating Pentachlorophenol in Solution or Wood, Reaffirmed 2018, incorporation by reference approved for §1728.202.

(5) AWPA M2–16, Standard for the Inspection of Preservative Treated Products for Industrial Use, Revised 2016, incorporation by reference approved for §1728.202.

(6) AWPA M3–16, Standard for the Quality Control of Preservative Treated Products for Industrial Use, Revised 2016, incorporation by reference approved for §§1728.201 and 1728.202.

(7) AWPA T1–18, Use Category System: Processing and Treatment Standard, Revised 2018, incorporation by reference approved for §1728.201.

(8) AWPA U1–18, Use Category System: User Specification for Treated Wood, Revised 2018, incorporation by reference approved for §§1728.201 and 1728.202.

(f) Insulated Cable Engineers Association (ICEA). The following material may be purchased from: IHS Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Phone: (303) 397–7956; (800) 854–7179, Fax: (303) 397–2740, email: global@ihs.com, website: <http://global.ihs.com>.

(1) ANSI/ICEA S–94–649–2004—Standard for Concentric Neutral Cables Rated 5 Through 46 KV (ANSI/ICEA S–94–649–2004), approved September 20, 2005, incorporation by reference approved for §1728.204.

(2) ANSI/ICEA T–31–610–2007—Test Method for Conducting Longitudinal Water Penetration Resistance Tests on Blocked Conductors (ANSI/ICEA T–31–610–2007), approved October 31, 2007, incorporated by reference approved for §1728.204.

(3) ICEA T–32–645–93—Guide for Establishing Compatibility of Sealed Conductor Filler Compounds with Conducting Stress Control Materials (ICEA T–32–645–93), approved February 1993,

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incorporated by reference approved for § 1728.204.

(g) Southern Pine Inspection Bureau Standards, 4709 Scenic Highway, Pensacola, Florida 32504-9094, telephone (850) 434-2611. The web address for the Southern Pine Inspection Bureau is <http://www.spib.org/>.

(1) Standard Grading Rules for Southern Pine Lumber, 2014 Edition, effective January 25, 2014, incorporation by reference approved for § 1728.201.

(2) [Reserved]

(h) West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, Oregon 97281, telephone (503) 639-0651, fax (503) 684-8928. The web address for is <http://www.wclib.org/>.

(1) Standard No. 17, Grading Rules for West Coast Lumber, Revised September 1, 2018, incorporation by reference approved for § 1728.201.

(2) [Reserved]

[76 FR 36963, June 24, 2011, as amended at 77 FR 19528, Apr. 2, 2012; 83 FR 55467, Nov. 6, 2018; 84 FR 28190, June 18, 2019]

§ 1728.98 Electric standards and specifications.

(a) To comply with this part, you must follow the requirements contained in the following REA/RUS bulletins. These bulletins are incorporated by reference in § 1728.97 of this part.

(1) Bulletin 50-4 (D-801), Specification and Drawings for 34.5/19.9 kV Distribution Line Construction (11-86).

(2) Bulletin 50-15 (DT-3), RUS Specifications for Pole Top Pins with 1¾" Diameter Lead Thread (1-51).

(3) Bulletin 50-16 (DT-4), RUS Specifications for Angle Suspension Brackets (3-52).

(4) Bulletin 50-19 (DT-7), RUS Specifications for Clevis Bolts (8-53).

(5) Bulletin 50-23 (DT-18), RUS Specifications for 60" Wood Crossarm Braces (2-71).

(6) Bulletin 50-31 (D-3), RUS Specifications for Pole Top Pins with 1" Diameter Lead Threads (2-79).

(7) Bulletin 50-32 (D-4), RUS Specifications for Steel Crossarm Mounted Pins with 1" Diameter Lead Threads (10-50).

(8) Bulletin 50-33 (D-5), RUS Specifications for Single and Double Upset Spool Bolts (2-51).

(9) Bulletin 50-34 (D-6), RUS Specifications for Secondary Swinging Clevises (12-70).

(10) Bulletin 50-35 (D-7), RUS Specifications for Service Swinging Clevises (9-52).

(11) Bulletin 50-36 (D-8), RUS Specifications for Service Deadend Clevises (9-52).

(12) Bulletin 50-40 (D-14), RUS Specifications for Pole Top Brackets for Channel Type Pins (9-51).

(13) Bulletin 50-41 (D-15), RUS Specifications for Service Wireholders (11-51).

(14) Bulletin 50-55 (T-2), RUS Specifications for Overhead Ground Wire Support Brackets (5-53).

(15) Bulletin 50-56 (T-3), RUS Specifications for Steel Plate Anchors for Transmission Lines (12-53).

(16) Bulletin 50-60 (T-9), RUS Specification—Single Pole Steel Structures, Complete with Arms (12-71).

(17) Bulletin 50-72 (U-4), RUS Specification for Electrical Equipment Enclosures (5-35 kV) (10-79).

(18) Bulletin 50-73 (U-5), RUS Specifications for Pad-Mounted Transformers (Single and Three-Phase) (1-77).

(19) Bulletin 50-74 (U-6), RUS Specification for Secondary Pedestals (600 Volts and Below) (10-79).

(20) Bulletin 50-91 (S-3), RUS Specifications for Step-Down Distribution Substation Transformers (34.4-138 kV) (1-78).

(21) Bulletin 1728F-700, RUS Specification for Wood Poles, Stubs and Anchor Logs (April 15, 2019).

(22) Bulletin 1728F-803, Specifications and Drawings for 24.9/14.4 kV Line Construction (10-98).

(23) Bulletin 1728F-804 (D-804), Specification and Drawings for 12.47/7.2 kV Line Construction, October 2005.

(24) Bulletin 1728F-806 (D-806) Specifications and Drawings for Underground Electric Distribution, October 11, 2018.

(25) Bulletin 1728F-810, Electric Transmission Specifications and Drawings, 34.5 kV to 69 kV (3-98).

(26) Bulletin 1728F-811, Electric Transmission Specifications and Drawings, 115 kV to 230 kV (3-98).

(b) The terms "RUS form", "RUS standard form", "RUS specification",

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and “RUS bulletin” have the same meanings as the terms “REA form”, “REA standard form”, “REA specification”, and “REA bulletin”, respectively unless otherwise indicated.

[76 FR 36964, June 24, 2011, as amended at 83 FR 55467, Nov. 6, 2018; 84 FR 28191, June 18, 2019]

§ 1728.201 Bulletin 1728H-701, Specification for Wood Crossarms (Solid and Laminated), Transmission Timbers and Pole Keys.

(a) *Scope.* (1) The specification in this section describes the minimum acceptable quality of wood transmission and distribution crossarms (hereinafter called arms) purchased by or for RUS borrowers. Where there is conflict between the specification in this section and any other specification referred to in this section, the specification in this section shall govern.

(2) The requirements of the specification in this section implement contractual provisions between RUS and borrowers receiving financial assistance from RUS. The contractual agreement between RUS and a RUS borrower requires the borrower to construct its system in accordance with RUS accepted plans and specifications. Each RUS electric and telecommunications borrower shall purchase only arms produced in accordance with the specification in this section. Each RUS electric and telecommunications borrower shall require a written confirmation from their selected contractor that all material utilized shall be produced in accordance with the specifications in this section.

(b) *General stipulations.* (1) Conformance of arms to RUS specifications is the responsibility of the producer. A member of the producer’s staff shall be designated as quality control supervisor and charged with the responsibility for the exercise of proper quality control procedures throughout the production process. The primary responsibility of third-party inspection agencies is to verify that producers involved in the manufacture of RUS treated wood products have functional in-house quality control systems in place that result in the shipment of materials meeting applicable RUS

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specification requirements to borrowers.

(2) Treated wood products intended for RUS borrowers shall not be inspected when in the opinion of the inspector, unsafe conditions are present.

(3) Various requirements relating to quality control and inspection that are contained in § 1728.202 and ANSI O5.2 and ANSI O5.3 (both incorporated by reference in § 1728.97) shall be followed exactly and shall not be interpreted or subject to judgment by the producer’s quality control personnel or by the third party inspector.

(4) The requirements of AWWA M3 (incorporated by reference in § 1728.97) pertaining to record keeping, pre-treatment storage, analytical laboratories, plant gauges and other plant facilities, shall be followed.

(5) The producer shall maintain its own properly staffed and equipped analytical laboratory or contract with an independent testing laboratory at or near the treating plant to provide the required analytical service. On a case-by-case basis, with written permission from RUS, a producer with more than one treatment facility may be allowed to use a central laboratory.

(6) Arms can be purchased under either of two purchase plans; a RUS approved Quality Assurance Plan or an Independent Inspection Plan. The method of inspection described in this section shall be used no matter which plan timber products are purchased under.

(7) All third-party inspectors involved in the inspection of RUS products shall maintain their impartiality when providing their inspection service. This requires that these individuals and their employers, as well as producers and suppliers involved in providing RUS borrowers with treated wood products, maintain a professional separation during the performance of their respective functions to eliminate any possible conflict of interest.

(8) With the exception of financial agreements for inspection services, inspection agencies shall neither accept nor provide gratuities or free services to suppliers.

(9) Inspection agencies shall not offer product warranties on inspected material.

(10) Arms shall be warranted to conform to this specification. Arms shall meet or exceed their minimum allowable dimensions for at least one year from time of delivery to the borrower. If any arm is determined to be defective or does not conform to this specification within 1 year from the date of delivery to the borrower, it shall be replaced as promptly as possible by the supplier. In the event of failure to do so, the purchaser may make such replacement and the cost of the arm, at destination, shall be recovered from the supplier.

(c) *Definitions.* The following definitions apply to this section:

Agency refers to Rural Utilities Service (RUS), United States Department of Agriculture.

Certificate of compliance is a written certification by an authorized employee of the producer that the material shipped meets the requirements of this specification and any supplemental requirements specified in a purchase order from a borrower or the borrower's contractor.

Crossarm refers to the structural wood member used to support electrical conductors and equipment. The word arm is used interchangeably with crossarm.

Independent inspection refers to examination of material by a trained inspector employed by a commercial inspection agency.

Inspection means an examination of material in sufficient detail to ensure conformity to all requirements of the specification under which it was purchased.

Lot is a certain number of pieces of a given item submitted for inspection at one time.

Producer is the party who manufactures arms. In some cases the producer may also be the treating plant.

Purchaser refers to either the RUS borrower or contractors acting as the borrower's agent, except where a part of the specification in this section specifically refers to only the borrower or the contractor.

Quality control supervisor refers to an employee of the producer designated to be responsible for quality control procedures carried out by said producer.

Reserve treated stock consists of treated material held in storage by a producer for purchase and immediate shipment to a borrower.

Supplier may refer to the producer, the treater, or to a third-party broker or distributorship involved in supplying RUS products to the borrowers.

Treating plant is the facility that applies the preservative treatment to the arms.

(d) *Material requirements*—(1) *Material and grade.* All arms furnished under the specification in this section shall be free of brashy wood, decay, and shall meet additional requirements as shown on specific drawings in this section. Arms shall be made of one of the following:

(i) Douglas-fir which conforms to the applicable provisions of paragraphs 170 and 170a, or the applicable transmission arm provisions of paragraphs 169 and 169a of the West Coast Lumber Standard No. 17 (incorporated by reference in §1728.97). Only coastal origin Douglas-fir shall be used for Douglas-fir arms manufactured under the specification in this section;

(ii) Southern Yellow Pine which conforms to the provisions of Dense Industrial Crossarm 65, as described in Southern Pine Inspection Bureau's Standard Grading Rules for Southern Pine Lumber (incorporated by reference at §1728.97); or

(iii) Laminated wood arms shall conform to ANSI O5.2 and have at least the same load carrying capacity as the solid sawn arms being replaced. The load carrying capacity of the laminated arms shall be determined by one of the procedures outlined in ANSI O5.2. The testing and inspection of laminated arms shall be in accordance with AITC 200 (incorporated by reference at §1728.97).

(2) *Alternative arms.* Borrowers may use alternative arms that are listed in Informational Publication 202-1, *List of Materials Acceptable for Use on Systems of USDA Rural Utilities Service Borrowers*. For information on the availability of such material, contact the Chairman, Technical Standards Committee "A" (Electric), 1400 Independence Ave. SW, Stop 1569, Washington, DC 20250-1569, or go to: https://www.rd.usda.gov/files/UEP_LoM.pdf.

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(3) *Knots*. Well-spaced round, firm, and tight knots are permitted.

(i) Slightly decayed knots are permitted, except on the top face, provided the decay extends no more than $\frac{3}{4}$ of an inch into the knot and provided the cavities will drain water when the arm is installed. For knots to be considered well-spaced, the sum of the sizes of all knots in any 6 inches of length of a piece shall not exceed twice

the size of the largest knot permitted. More than one knot of maximum permissible size shall not be in the same 6 inches of length. Slightly decayed, firm, or round “pin knots” ($\frac{3}{8}$ of an inch or less) are not considered in size, spacing, or zone considerations.

(ii) Knots are subject to limits on size and location as detailed in Tables 1 and 2 to this paragraph (d)(3)(ii).

TABLE 1 TO PARAGRAPH (d)(3)(ii)—KNOT LIMITS FOR DISTRIBUTION ARMS (SEE FIGURE 1 TO THIS SECTION)

[All dimensions in inches]

Class of knot and location	Maximum knot diameter	
	Close grain	Dense grain
Round Knots:		
Single Knot: Maximum Diameter Center Section ¹		
Upper Half	$\frac{3}{4}$	1
Lower Half	1	$1\frac{1}{4}$
Elsewhere	$1\frac{1}{4}$	$1\frac{1}{2}$
Sum of Diameters in 6-Inch Length: Maximum Center Section:		
Upper Half	$1\frac{1}{2}$	2
Lower Half	2	$2\frac{1}{2}$
Elsewhere	$2\frac{1}{2}$	3

¹ No knot shall be closer than its diameter to the pole mounting hole.

TABLE 2 TO PARAGRAPH (d)(3)(ii)—KNOT LIMITS FOR TRANSMISSION ARMS (SEE FIGURE 2 TO THIS SECTION)

[All dimensions in inches]

Pole mounting hole zone ¹		Maximum diameter for single knot	
Upper Half (inner zone)		$\frac{3}{4}$.	
Upper Half (outer zone)		1 for close grain.	
		$1\frac{1}{4}$ dense grain.	
Other locations transmission arm size ²	Narrow face	Wide face (two sides)	
		Edge	Along centerline
$4\frac{5}{8} \times 5\frac{5}{8}$ or less	1	$1\frac{1}{4}$	$1\frac{1}{4}$
$5\frac{5}{8} \times 7\frac{5}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{7}{8}$
$3\frac{5}{8} \times 9\frac{5}{8}$	$\frac{3}{4}$	$1\frac{3}{4}$	$2\frac{1}{4}$

¹ No knot shall be closer than its diameter to the pole mounting hole.

² For cross sections not shown, refer to grading rules.

(iii) Knot clusters shall be prohibited unless the entire cluster, measured on the worst face, is equal to or less than the round knot allowed at the specific location.

(iv) Spike knots shall be prohibited in deadend arms. Any spike knot across the top face shall be limited to the equivalent displacement of a knot $\frac{3}{8}$ of an inch deep on one face and the maximum round knot for its particular location on the worst face, with a maximum width of 1 inch measured at the

midpoint of the spiked section. Elsewhere across the bottom or side faces, spike knots shall not exceed $\frac{1}{2}$ the equivalent displacement of a round knot permitted at that location, provided that the depth of the knot on the worst face shall not exceed the maximum round knot allowed at that location.

(v) Loose knots shall be prohibited in deadend arms. Loose knots and knot holes shall be permitted only if they allow water to drain when the arm is

installed in its normal position. In the center section, upper half, loose knots shall not be greater than $\frac{1}{2}$ the dimensions of round knots. Elsewhere, loose knots shall not be greater than the round knot dimension.

(vi) All knots except those “spike” knots intersecting a corner shall be measured on the least diameter of the knot.

(vii) A knot shall be considered to occupy a specific zone or section if the center of the knot (*i.e.*, pith of knot) is within the zone or on the zone’s boundary.

(viii) If a round or oval knot appears on two faces and is in two zones, each face shall be judged independently. When this does not occur, average the least dimension showing on both faces. Knots which occur on only one face of a free of heart center (FOHC) arm shall be permitted to be 25 percent larger than the stated size.

(ix) Two or more knots opposite each other on any face shall be limited by a sum not to exceed the size of a maximum single knot permitted for the location. On all four faces, all knots shall be well spaced.

(x) No knot over $\frac{5}{8}$ inch in diameter may intersect pin holes in the center section. One-inch diameter knots may intersect insulator pin holes elsewhere.

(e) *Miscellaneous characteristics, features and requirements.* (1) The top face of distribution arms shall not have more than four medium pitch and bark pockets in 8-foot arms, and not more than five pitch and bark pockets in 10-foot arms. Elsewhere a maximum of six medium pitch and bark pockets in 8-foot arms and eight in 10-foot arms shall be permitted. Equivalent smaller pockets shall be permissible. An occasional large pocket is permissible.

(2) Shakes shall be prohibited.

(3) Prior to treatment on properly seasoned arms, single face checks shall not exceed an average penetration of $\frac{1}{4}$ the depth from any face and shall be limited to 10 inches long on the top face, and $\frac{1}{2}$ the arm length on the other faces. Checks shall not be repeated in the same line of grain in adjacent pin holes. The sum of the average depths of checks occurring in the same plane on opposite faces shall be limited to $\frac{1}{4}$ the face depth.

(4) Compression wood shall be prohibited on any face. Compression wood is permitted if wholly enclosed in the arm, more than six annual rings from the surface, and not over $\frac{3}{8}$ of an inch in width.

(5) Insect holes $\frac{3}{32}$ of an inch and larger shall be prohibited. Insect pin holes (*i.e.*, holes not over $\frac{1}{16}$ of an inch diameter) shall be allowed if scattered and not exceeding 10 percent of the arm girth.

(6) Wane shall be allowed on one edge, limited to approximately 1 inch measured across the corner. Outside of the top center section, an aggregate length not to exceed 2 feet may have wane up to $1\frac{1}{2}$ inches on an occasional piece on one or both edges. Bark shall be removed.

(7) Prior to and after preservative treatment, crook, bow, or twist shall not exceed $\frac{1}{2}$ of an inch in 8-foot arms and $\frac{5}{8}$ of an inch in 10-foot arms.

(f) *Manufacturing—(1) Quality of work.* All arms shall be of the highest quality production. Arms shall be dressed on all four sides, although “hit and miss skips” may occur on two adjacent faces on occasional pieces.

(2) *Dimensions and tolerances.* All dimensions and tolerances shall conform to those shown on the drawings in this section or drawings supplied with the purchase order. Arms supplied shall meet or exceed minimum dimensions shown on the drawings in this section. Cross-sectional dimensions shall be measured and judged at about $\frac{1}{4}$ the arm length, except when the defects of “skip dressing” or “machine bite or offset” are involved.

(3) *Shape.* The shape of the arms at any cross section, except for permissible wane, shall be as shown on the respective drawings in this section or supplied with the order. The two top edges may be either chamfered or rounded $\frac{3}{8}$ of an inch radius. The two bottom edges shall be slightly eased $\frac{1}{8}$ of an inch radius for the entire length.

(4) *Lamination techniques.* Lamination techniques shall comply with ANSI O5.2.

(5) *Pin and bolt holes.* Pin and bolt holes shall be smoothly bored without undue splintering where drill bits break through the surface. The center of any hole shall be within $\frac{1}{8}$ of an inch

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of the center-line locations on the face in which it appears. Holes shall be perpendicular to the starting and finishing faces.

(6) *Incising.* The lengthwise surfaces of Douglas-fir arms shall be incised a minimum of $\frac{1}{4}$ of an inch deep. The incision shall be reasonably clean cut with a spacing pattern that ensures uniform penetration of preservative.

(g) *Conditioning prior to treatment.* AWP A T1 (incorporated by reference at § 1728.97) shall be followed.

(1) All solid sawn arms shall be made of lumber which has been kiln-dried. Douglas-fir arms shall have an average moisture content of 19 percent or less, with a maximum not to exceed 22 percent in a single arm. Southern Yellow Pine arms shall have an average moisture content of 22 percent or less, with a maximum not to exceed 30 percent in a single arm.

(2) Moisture content levels shall be measured at about $\frac{1}{4}$ the length and at a depth of about $\frac{1}{2}$ the arm's thickness. Additionally, the moisture content gradient between the shell (*i.e.*, $\frac{1}{4}$ of an inch deep) and the core (*i.e.*, about 1 inch deep) shall not exceed 5 percentage points.

(3) A minimum of at least 20 solid sawn arms per treating charge shall be measured and the individual results recorded by the producer to verify moisture content.

(4) The moisture content of lumber used in laminating shall, at the time of gluing, be within the range of 8 to 12 percent, inclusive.

(h) *Preservatives.* (1) Creosote, waterborne preservatives, pentachlorophenol and copper naphthenate shall conform to the requirements of AWP A U1 (incorporated by reference at § 1728.97). Oxide formulations of waterborne preservatives shall be supplied. If CCA is the selected preservative, CCA-C shall be the type required.

(2) Douglas-fir arms shall not be treated with CCA.

(i) *Preservative treatment.* (1) All timber products manufactured under the specification in this section shall be pressure treated. AWP A T1 shall be followed.

(2) These materials may be further conditioned by steaming, or by heating

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in hot oil (Douglas-fir), within the following time and temperature limits:

	Max. time (hours)	Temperature
(i) Steam	3	220 °F
(ii) Heating in Preservation	3	210 °F

(3) A final steam or hot oil bath may be used only to meet cleanliness requirements. Total duration of the final steam bath shall not exceed 2 hours and the temperature shall not exceed 240 °F.

(j) *Results of treatment—(1) Penetration and retention.* The quality control supervisor shall test or supervise the testing of each treated charge for penetration and retention.

(2) *Method of sampling.* When testing penetration and retention, a borer core shall be taken from a minimum of 20 arms in each treating charge. The borings shall be taken from any face except the top face at a point as close to the end as possible, being at least 3 inches from the end of the arm and no closer than 3 inches from the edge of the holes. The bored holes shall be plugged with treated plugs. Borings from laminated arms shall not be taken from the same laminate unless there is an end joint separation.

(3) *Preservative penetration.* All of the sapwood present in Douglas-fir and southern yellow pine arms shall be completely penetrated with preservative. Preservative penetration in the heartwood of Douglas-fir arms shall be not less than 3 inches longitudinally from the edge of holes and ends, and at least $\frac{3}{16}$ inch from the surface of any face.

(4) *Preservative retention.* Preservative retention in the outer 0.6 inch for Douglas-fir arms and in the outer one inch of southern yellow pine arms shall be not less than the following:

Preservative	Retention (pcf)
(i) Creosote	8.0
(ii) Pentachlorophenol	10.4
(iii) ACA, ACZA, or CCA-C	0.4
(iv) Copper Naphthenate	0.04

¹ This penta retention is for the lime ignition method. If the copper pyridine method is used when timbers may have been in contact with salt water, a penta retention of 0.36 pcf is required for all species native to the Pacific Coast region.

(5) *Arms surfaces.* The surfaces of all arms shall be free from oil exudation (bleeding) and pentachlorophenol crystallization (blooming), and other surface deposits.

(6) *Retreatment of arms.* Arms may be retreated no more than twice. Initial treatment steaming time plus re-treatment steaming time, combined, shall not exceed total steaming time allowed.

(k) *Marking/branding.* (1) Before treatment, arms shall be legibly branded to a depth of approximately $\frac{1}{16}$ of an inch, with the top of the brand oriented to the top of the arm. The brand shall be placed on either of the wide surfaces of the arm, approximately one foot from the midpoint of the piece.

(2) The letters and figures shall be not less than $\frac{1}{2}$ of an inch in height.

(3) The brand shall include:

(i) The manufacturer's identification symbol;

(ii) Month and year of manufacture;

(iii) Species (DF for Douglas-fir and SP for southern yellow pine);

(iv) Preservative (C for creosote, P for penta, S for waterbornes, N for Copper Naphthenate); and

(v) Required retention. An example of required retention is: M-6-16 Manufacturer—Month—Year and DF-P-.4 Douglas—fir—penta treated—.40 pcf retention

(4) Brands and quality assurance/inspection marks shall be removed from arms that do not meet these specifications.

(1) *Storage.* (1) Producers may manufacture/treat RUS arms for reserve treated stock under either of the allowable purchase plans. (See paragraph (b)(6) of this section).

(2) Arms treated with creosote or oilborne preservatives, and which have been held in storage for more than 1 year before purchase and shipment to the borrower shall be re-assayed before shipment. Any such arms found to be nonconforming for retention shall be retreated and reassayed per the requirements of this section of the specification.

(m) *Drawings.* (1) The drawings of Figure 3 to this section, Crossarm Drilling Guide, have a type number and show in detail the hole size, shape, and

pattern desired for arms ordered under the specification in this section.

(2) Purchase orders shall indicate the type arm required.

(3) Arms shall be furnished in accordance with the details of the drawings in this section or in accordance with drawings attached to the purchase order.

(4) Appropriate drawings for transmission arms are to be specified and included with purchase orders. Technical drawings for transmission arms are published in Bulletin 1728F-811 (incorporated by reference at §1728.97) and Bulletin 1728F-810 (incorporated by reference at §1728.97).

(n) *Destination inspection.* The RUS borrower shall have the prerogative to inspect materials at destination. All provisions of the specification in this section shall apply to material inspected at destination. If a disagreement arises over conformance of materials received at destination, it shall be the responsibility of the supplier to resolve the matter with the purchaser.

(o) *Purchase of related specifications and standards.* (1) All ANSI and AWP standards may be purchased from: American Wood Protection Association (AWPA), P.O. Box 361784, Birmingham, AL 35236-1784, Telephone (205)733-4077, Web address: <http://www.awpa.com>.

(2) Standard Grading Rules for Southern Pine Lumber and Special Products Rules for Structural, Industrial, and Railroad Freight Car Lumber may be purchased from: Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, Florida 32504-9094, Telephone (850) 434-2611, Web address: <http://www.spib.org>.

(3) Standard Grading Rules for West Coast Lumber may be purchased from: West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, Oregon 97281, Telephone (503) 639-0651, Web address: <http://www.wclib.org>.

(4) AITC 200 may be purchased from: American Institute of Timber Construction, 7012 S Revere Park Way, Englewood, Colorado 80112, Telephone (303) 792-9559, Web address: <http://aitc-glulam.org>.

(p) *Information to be completed by the borrower.* When using the specification

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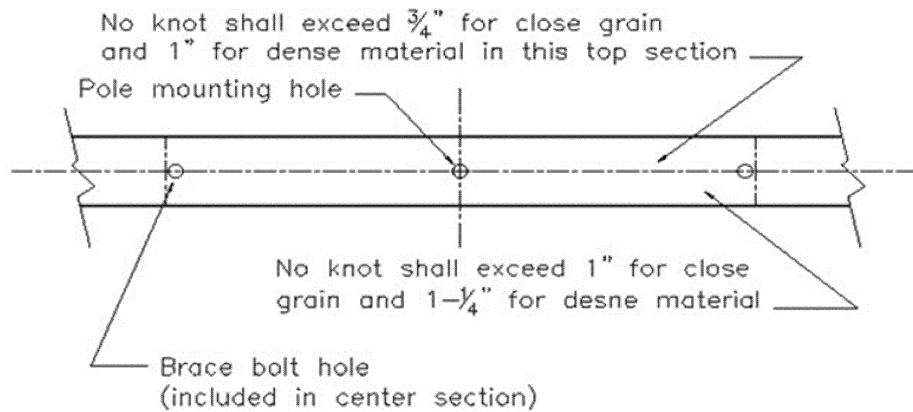
in this section, the borrower or borrower's representative should enter into a written agreement with a material supplier by way of a contract or

purchase order. This agreement should state that all arms shall be manufactured in strict accordance with the specifications in this section.

Figures 1 and 2 to § 1728.201
Distribution and Transmission Arms

DISTRIBUTION ARMS

Figure 1



TRANSMISSION ARMS
POLE MOUNTING HOLE ZONE

Figure 2

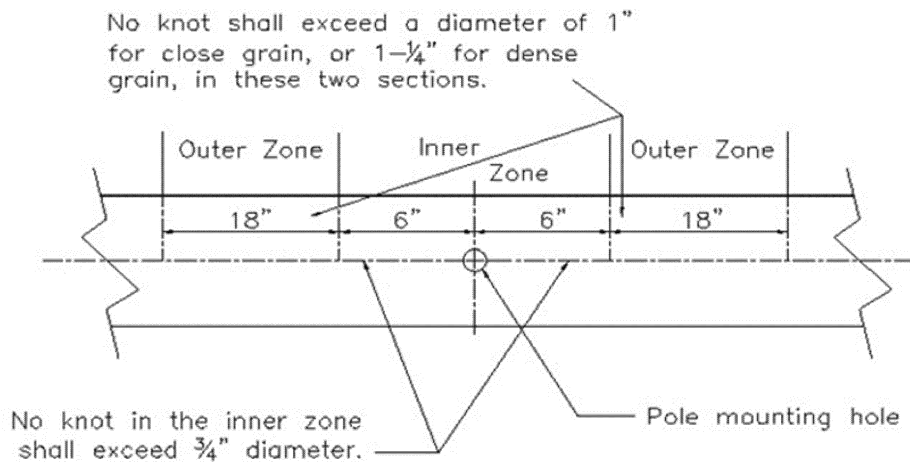
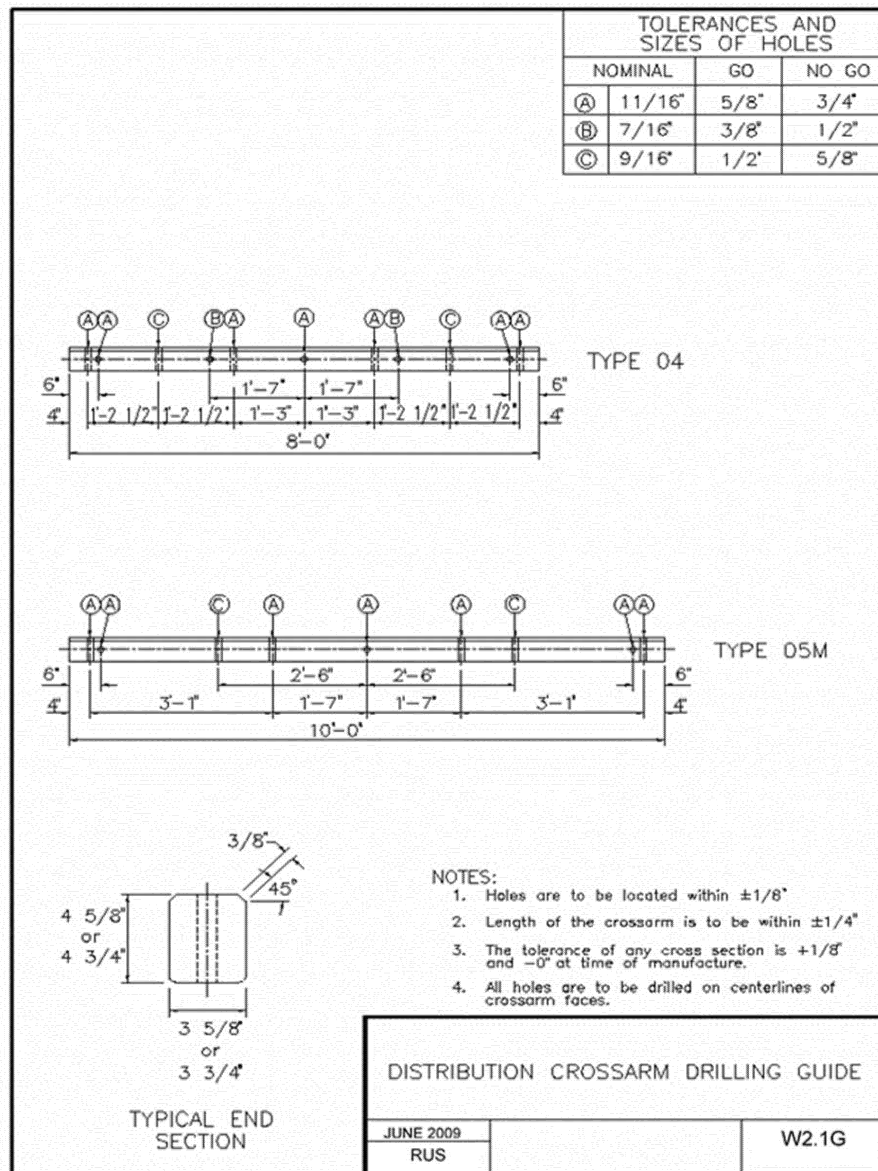


Figure 3 to §1728.201 – Crossarm Drilling Guide



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[84 FR 28191, June 18, 2019]

§ 1728.202 Bulletin 1728H-702, Specification for Quality Control and Inspection of Timber Products.

(a) *Scope.* (1) The specification in this section describes the responsibilities and procedures pertaining to the quality control by producers and pertaining to inspection of timber products produced in accordance with the following RUS specifications in § 1728.201, and poles, covered in Bulletin 1728F-700 (incorporated by reference in § 1728.97) and in § 1755.97 of this chapter.

(2) Where there is conflict between the specification in this section and any other specification referred in this section, the specification in this section shall govern.

(3) The specification in this section also describes and designates responsibilities of RUS borrowers in regard to their purchases under the specifications referenced in paragraph (a)(1) of this section.

(b) *General stipulations.* (1) Conformance of poles and crossarms to RUS specifications is the responsibility of the producer. A member of the producer's staff shall be designated as quality control supervisor and charged with the responsibility for the exercise of proper quality control procedures throughout the production process. The primary responsibility of third party inspection agencies is to verify that producers involved in the manufacture of RUS treated wood products have functional in-house quality control systems in place that result in the shipment of materials meeting applicable RUS specification requirements to borrowers.

(2) The requirements of AWP A M3 (incorporated by reference at § 1728.97), pertaining to recordkeeping, pretreatment storage, analytical laboratories, plant gauges, and other plant facilities, shall be followed.

(3) Treated wood products intended for RUS borrowers shall not be inspected when in the opinion of the inspector, unsafe conditions are present.

(4) Poles and crossarms can be purchased under either of two purchase plans; a RUS approved Quality Assurance Plan or an Independent Inspection Plan. The method of inspection de-

scribed in this section shall be used no matter which plan timber products are purchased under.

(5) Under the Independent Inspection Plan, the borrower should designate in the purchase order which inspection agency it has selected. Unless the borrower contracts for inspection as a separate transaction, the treating company shall obtain the services of the borrower's designated inspection agency. For reserve treated stock held in inventory by the producer, the producer shall obtain the services of the appropriate inspection program.

(6) All third-party inspectors involved in the inspection of RUS products shall maintain their impartiality when providing their inspection service. This requires that these individuals and their employers, as well as producers and suppliers involved in providing RUS borrowers with treated wood products, maintain the greatest degree of professional separation during the performance of their respective functions to eliminate any possible conflict of interest.

(7) With the exception of financial agreements for inspection services, inspection agencies shall not accept nor provide gratuities or free services to suppliers.

(8) Inspection agencies shall not offer product warranties on inspected material.

(9) Inspection agencies shall have and maintain liability insurance in the amount of \$500,000 and a surety bond or miscellaneous Errors and Omission insurance for consequential damages for not less than \$250,000. Evidence of compliance to the requirement in this paragraph (b)(9) shall be forwarded to the RUS annually. The evidence shall be in the form of a certificate of insurance or a Bond signed by a representative of the insurance or Surety Bonding company and include a provision that no change in, or cancellation of, will be made without the prior written notice to Chairman, Technical Standards Committee "A" (Electric).

(10) Inspection agencies shall maintain their own properly equipped laboratory that, at a minimum, is able to run the referee methods listed in table 1 to this paragraph (b)(10) for retention

analysis for all preservatives being inspected. This laboratory shall be independent from any treating plant laboratory. Inspection Agencies may use one central laboratory. All XRF units maintained by third party inspection agencies as part of their RUS required laboratories shall be calibrated at least quarterly by said agency utilizing the referee method for each preservative treatment being analyzed or via comparison with a set of graduated treated wood standards. Each agency shall keep an up-to-date written record of these quarterly calibration results. AWP A83 (incorporated by reference at §1728.97) shall be followed for Pentachlorophenol testing, AWP A6 (incorporated by reference at §1728.97) shall be followed for Creosote testing and AWP A9 (incorporated by reference at §1728.97) shall be followed for XRF be followed, as illustrated in the following table:

TABLE 1 TO PARAGRAPH (b)(10)

Preservative	Referee method
Pentachlorophenol	Lime Ignition, Copper Pyridine.
Creosote	Toluene Extraction.
Waterborne	X-ray fluorescence (XRF).
Copper	X-ray fluorescence (XRF).
Naphthenate.	

(11) If used for analysis, plant XRF units shall be accurate and generate reproducible results per AWP A9. At least once monthly, their accuracy and precision shall be checked by the third-party inspector. This verification shall consist of the inspector taking a retention sample previously analyzed by the plant quality control supervisor on-site and rerunning it in the inspection agency's own laboratory using said agency's XRF unit or the referee method for a specific preservative. If the inspection agency's analytical result is within +5% of the plant's retention result on that sample, the plant XRF unit needs no further calibration.

(12) Individual inspectors in the employ of inspection agencies shall be properly trained and experienced. See §1728.203, for details of an inspector's minimum qualifications. Upon request, inspection agencies must provide RUS with detailed written documentation verifying that each of their employees

inspecting RUS materials has the minimum experience and training described in §1728.203. Failure of an individual inspector to follow proper procedures or failure of an inspection agency to properly train and supervise their inspectors or follow applicable RUS specifications constitutes grounds for RUS debarment of said inspector and said inspection agency from future inspection of RUS financed material.

(c) *Quality control and inspection procedures.* It is the responsibility of the plant quality control supervisor to perform the following procedures to ensure that a particular lot of material conforms to the requirements of the applicable Agency specification prior to treatment. After the plant quality control supervisor has performed these procedures, a particular lot of material shall be released to the inspector for verification of conformance.

(1) For poles, inspection prior to treatment shall include:

(i) Ample space and assistance shall be provided by the treating plant for handling and turning poles. Regardless of the purchase plan poles are being purchased under, all poles in a lot shall be inspected by the plant quality control supervisor prior to offering the lot for verification by a third party.

(ii) When limited by the purchaser in a written purchase order, moisture content shall be measured with a calibrated electronic moisture meter. Calibration of the moisture meter shall include not only the zero settings for the X and Y readings, but also two resistance standards for 12 and 22 percent moisture content. Material failing to conform for moisture content may be retested upon request after recalibration of the moisture meter.

(iii) Dimensions, length, and circumference shall be measured by a standard steel tape to determine that they meet specification requirements and that they agree with the details for class and length found in the face brand/tag and butt of each pole. If it is obvious by visual comparison with a measured pole that the brand information regarding class and length is correct, individual poles need not be measured. Pole circumference dimensions

measured prior to treatment shall govern acceptance. Reduction in dimension due to treatment and shipping shall be no more than 2 percent below the minimum for the pole class.

(iv) Poles in a lot shall be of the same seasoning condition and all shall be inspected for decay. If the plant quality control supervisor suspects that decay is present in a pole, a slice from both ends shall be cut for closer examination. If 3 percent or more of the poles in the lot inspected by the plant quality control supervisor show evidence of decay, the entire lot shall be unconditionally withdrawn without further sorting.

(v) Under the Independent Inspection Plan, all poles shall be examined by the third-party Inspector for verification of conformance. Under a RUS approved Quality Assurance Plan, the number of poles inspected for verification of conformance may vary according to the terms of the approved plan.

(vi) Whenever it becomes evident during third party inspection of any lot of poles offered by the producer that non-conforming pieces exceed 3 percent for any one defect or 5 percent for all defects, the inspector shall withhold further inspection and reject the balance of the lot. After the producer has acted to eliminate all defective pieces, the rejected balance may be inspected as a new lot. Sorting, however, shall not be permitted when a lot has been rejected for decay.

(vii) Re-examination for mechanical damage or deterioration and for original acceptance shall be conducted on timber products not treated within 10 days after the original third-party inspection.

(2) For crossarms, inspection prior to treatment shall include:

(i) Regardless of the purchase plan arms are being purchased under, all arms in a lot shall be inspected by the plant quality control supervisor prior to offering the lot for verification by a third party. After the plant quality control supervisor has performed the procedures in paragraphs (c)(2)(ii) through (vii) of this section, a particular lot of arms shall be released to the inspector for verification of conformance.

(ii) Moisture content of the arms in the lot shall be checked with a calibrated moisture meter.

(iii) Surface inspection of both ends and the side surfaces of each arms. Particular attention shall be paid to visible defects such as compression wood, red heart, honeycomb and other forms of decay, shakes, splits, through checks, low density, wane, undersize, and pitch pockets.

(iv) Inspection of bolt and insulator pin holes for proper location, dimension and excessive splintering.

(v) Inspection of brands for proper location, required content and legibility.

(vi) Under the Independent Inspection, both ends of all crossarms and a random representative sample of the lengthwise side faces of all crossarms shall be inspected. The sample size shall equal 20 percent of the lot size or 200 arms, whichever is smaller. Under a RUS approved Quality Assurance Plan, the number of crossarms inspected for verification of conformance may vary according to the terms of the approved plan.

(vii) Whenever it becomes evident during third party inspection of any lot of arms offered by the producer that non-conforming pieces exceed 2 percent of the sample size, the entire lot shall be rejected. After the producer has acted to eliminate all defective pieces, the rejected balance may be inspected as a new lot.

(d) *Preservatives.* Creosote, water-borne preservatives, pentachlorophenol and copper naphthenate shall conform to current AWP A U1 (incorporated by reference in §1728.97).

(e) *Results of treatment—Poles.* (1) Following treatment, poles shall be sampled for preservative retention and penetration utilizing a calibrated increment borer 0.2 inches +0.02 inches in diameter in accordance with procedures listed in AWP A M2 (incorporated by reference in §1728.97).

(2) Inspectors may take their own retention samples and analyze them concurrently with those taken by the quality control supervisor, but each shall work independently. The results of the plant's analysis shall be presented before verification and acceptance of the charge by the third-party inspector.

(3) Unless otherwise specified, borings shall be taken from the section of the pole extending from 1 foot below the face brand/tag to 1 foot above the face brand/tag. For pressure treated Western Red Cedar, Alaska Yellow Cedar and all butt treated poles, borings shall be taken from the section of the pole approximately 1 foot below groundline.

(4) For all species, core samples shall be taken from 20 poles in charges of 20 or more poles. If a charge consists of less than 20 poles, each pole shall be bored and then individual poles shall be

bored a second time to obtain a minimum of 20 core samples. Any additional borings required to obtain the required 20 core samples shall be taken in a manner that represents the lot of material with respect to variations in size, seasoning condition, or other features that may affect the results of treatment.

(5) Retention and penetration samples shall consist of borings representative of pole volumes for each class and length in the charge, as illustrated in the following table:

TABLE 2 TO PARAGRAPH (e)(5)

Number of poles	Class/length	Vol. in ft ³	% of total vol.	Number of borings ¹
20	5/40	550	22	4
30	4/40	840	34	7
20	4/45	510	20	4
20	3/45	600	24	5
Total		2,500		

¹Retention and penetration requirements for each different species and preservative are listed in Table 10 of Appendix A, RUS Bulletin 1728F-700, Specification for Wood Poles, Stubs and Anchor Logs (incorporated by reference at § 1728.97).

(6) Preservative retention analyses shall be performed per the standard AWP A U1, (incorporated by reference at § 1728.97).

(7) Penetration compliance of both poles and crossarms shall be determined in accordance with the standard AWP A A15 (incorporated by reference at § 1728.97). Chrome Azurol S and Penta-Check shall be used to determine the penetration of copper containing preservatives and penta, respectively.

(8) All bored holes created by penetration and retention sampling shall be promptly filled with tight fitting treated plugs.

(9) Penetration sampling of poles shall be carried out as follows:

(i) Group A poles (Those poles with a circumference of 37.5 inches or less at 6 feet from butt.):

(A) Bore 20 poles or 20 percent of the poles in the charge, whichever is greater. Accept all poles in the charge for penetration if every boring in the sample conforms. If any sample fails penetration, bore all poles in the charge.

(B) If more than 15% of the poles in the charge are found to be nonconforming, the entire charge shall be re-

treated. If 15% or less are found to be nonconforming, remove and retreat only those that are nonconforming.

(ii) Group B poles (Those poles with a circumference greater than 37.5 inches at 6 feet from the butt.):

(A) For Group B poles 45 feet and under, bore each pole in the charge. If more than 15% of these poles are found to be nonconforming, the entire charge shall be retreated. If 15% or less are found to be nonconforming, remove and retreat only those that are nonconforming.

(B) For Group B poles 50 feet and over, bore each pole twice at 90 degrees apart and accept only those poles conforming to penetration in both borings.

(iii) Nonconforming poles may be treated only twice. The letter "R" shall be added to the original charge number in the butts of all poles that are retreated. Poles failing to meet treatment requirements after two retreatments shall be permanently rejected and all brand and butt information removed.

(f) *Results of treatment—Crossarms.* Retention and penetration samples shall be taken from not less than 20 crossarms in each charge. The sampling

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method and retention and penetration requirements for both Douglas-fir and Southern Yellow Pine crossarms are listed in § 1728.201.

(g) *Product acceptance.* (1) Third party inspectors shall verify their acceptance of untreated poles that have been offered by the producer as conforming by marking each accepted piece in the tip with a clear, legible hammer stamp. Following treatment, inspectors shall verify their acceptance of treated poles that have been offered by the producer as conforming by marking each accepted piece in the butt with a clear, legible hammer stamp. Inspection marks are not to be placed in the butt surfaces of any poles prior to treatment and proper retention analysis and penetration testing being completed. The inspector shall personally mark each piece for acceptance and shall not delegate this responsibility to any other individual.

(2) Each inspector or inspection agency shall retain for a period of at least one year a copy or transcript of each pre-treatment inspection report and a copy of analytical worksheets covering retention and penetration test results for each treated charge of material inspected. On request, a copy or transcript of these reports shall be furnished to the Chairman, Technical Standards Committee "A", Rural Utilities Service, Washington, DC 20250-1569.

(i) On each inspection report the third-party inspector and the plant quality control supervisor shall certify in writing that the material listed on the report has been properly inspected both before and after treatment and that the preservative used met the requirements of this section. Inspection reports shall also include the following information:

(A) Conditioning details of the material prior to treatment.

(B) Total number of pieces offered by the producer.

(C) Number of pieces rejected by the inspector, cause for rejection.

(D) Copy of preservative analysis (usually supplied by the preservative supplier).

(E) Treating sheet containing details of treatment for each charge.

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(F) Separate worksheets for retention analyses done by the plant quality control supervisor and by the inspector.

(G) Penetration result on each individual core boring taken from poles in the charge.

(ii) [Reserved]

(h) *Laminated materials.* (1) All lumber used to fabricate laminated materials shall be inspected and its grade verified by a qualified lumber grader, then marked appropriately.

(2) Laminated materials shall comply with manufacturing requirements specified in ANSI O5.2 (incorporated by reference at § 1728.97). Melamine urea adhesives shall not be used. Plant quality control procedures and any third-party inspection shall be conducted in accordance with AITC 200 (incorporated by reference at § 1728.97), and § 1728.201 (Bulletin 1728H-701).

(3) Following treatment, laminated material shall be checked for proper preservative retention and penetration, and for any evidence of delamination. All conforming laminated materials shall be clearly marked with either an American Institute of Timber Construction (AITC) or American Plywood Association (APA) quality stamp.

(i) *Safety provisions.* Poles intended for agency borrowers shall not be inspected when, in the opinion of the inspector, unsafe conditions are present.

[84 FR 28198, June 18, 2019]

§ 1728.203 Inspector's qualifications.

Inspection agencies must assure borrowers that employees assigned to the inspection of timber products and preservative treatments are competent and experienced. In general, any of the following examples are considered as minimum qualifying experience before an individual may be permitted to inspect timber products for borrowers:

(a) Three years of direct experience inspecting untreated and treated utility products; or

(b) Three years of direct experience conducting in-plant quality control work at a treating plant producing treated utility products; or

(c) Under the direct supervision of an experienced, qualified inspector, the individual shall have performed the following:

(1) For poles, inspected at least 10,000 individual untreated poles, and checked preservative penetration on at least 3,000 individual poles;

(2) For crossarms, inspected at least 5,000 individual untreated arms and checked penetration on at least 500 individual arms;

(3) Conducted at least 100 retention assays, including at least 25 analyses for each different preservative treatment being inspected.

(d) In both paragraphs (a) and (b) of this section, the experience should be not less than that required in paragraph (c) of this section.

(e) Individuals involved in the inspection of more than one commodity must have the minimum experience required in paragraph (c) of this section for each respective product.

[84 FR 28200, June 18, 2019]

§ 1728.204 Electric standards and specifications for materials and construction.

(a) *General specifications.* This section details requirements for 15 and 25 kV single phase, V-phase, and three-phase power cables for use on 12.5/7.2 kV (15 kV rated) and 24.9/14.4 kV (25 kV rated) underground distribution systems with solidly multi-grounded neutral. Cable complying with this specification shall consist of solid or strand-filled conductors which are insulated with tree-retardant cross-linked polyethylene (TR-XLPE) or ethylene propylene rubber (EPR), with concentrically wound copper neutral conductors covered by a nonconducting or semiconducting jacket. 35 kV rated cables may be used in 24.9/14.4 kV application where additional insulation is desired.

(1) The cable may be used in single-phase, two (V)-phase, or three-phase circuits.

(2) Acceptable conductor sizes are: No. 2 AWG (33.6 mm²) through 1000 kcmil (507 mm²) for 15 kV cable, No. 1 AWG (42.4 mm²) through 1000 kcmil (507 mm²) for 25 kV, and 1/0 (53.5 mm²) through 1000 kcmil (507 mm²) for 35 kV cable.

(3) Except where provisions therein conflict with the requirements of this specification, the cable shall meet all applicable provisions of ANSI/ICEA S-94-649-2004 (incorporated by reference

in §1728.97). Where provisions of the ANSI/ICEA specification conflict with this section, §1728.204 shall apply.

(b) *Definitions.* As used in this section:

Agency refers to the Rural Utilities Service (RUS), an agency of the United States Department of Agriculture's (USDA), hereinafter referred to as the Agency.

EPR Insulating Compound is a mixture of ethylene propylene base resin and selected ingredients.

TR-XLPE Insulating Compound is a tree retardant crosslinked polyethylene (TR-XLPE) insulation compound containing an additive, a polymer modification filler, which helps to retard the growth of electrical trees in the compound.

(c) *Phase conductors.* (1) Central phase conductors shall be copper or aluminum as specified by the borrower within the limit of §1728.204(a)(2).

(2) Central copper phase conductors shall be annealed copper in accordance with ASTM B 3-01 (incorporated by reference in §1728.97). Concentric-lay-stranded phase conductors shall conform to ASTM B 8-04 (incorporated by reference in §1728.97) for Class B stranding. Compact round concentric-lay-stranded phase conductors shall conform to ASTM B 496-04 (incorporated by reference in §1728.97). Combination unilay stranded phase conductors shall conform to ASTM B 787/B 787M-04 (incorporated by reference in §1728.97). Compact round atranded copper conductors using single input wire construction shall conform to ASTM B835-04 (incorporated by reference in §1728.97). Compressed round stranded copper conductors, hard, medium-hard, or soft using single input wire construction shall conform to ASTM B902-04a (incorporated by reference in §1728.97). If not specified, stranded phase conductors shall be Class B stranded.

(3) Central aluminum phase conductors shall be one of the following:

(i) Solid: Aluminum 1350 H12 or H22, H14 or H24, H16 or H26, in accordance with ASTM B 609/B 609M-99 (incorporated by reference in §1728.97).

(ii) Stranded: Aluminum 1350 H14 or H24, H142 or H242, H16, or H26, in accordance with ASTM B 609/B 609M-99

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(incorporated by reference in § 1728.97) or Aluminum 1350-H19 in accordance with ASTM B 230/B 230M-07 (incorporated by reference in § 1728.97). Concentric-lay-stranded (includes compacted and compressed) phase conductors shall conform to ASTM B 231/B 231M-04 (incorporated by reference in § 1728.97) for Class B stranding. Compact round concentric-lay-stranded phase conductors shall conform to ASTM B 400-08 (incorporated by reference in § 1728.97). Combination unilay stranded aluminum phase conductors shall conform to ASTM B 786-08 (incorporated by reference in § 1728.97). If not specified, stranded phase conductors shall be class B stranded.

(4) The interstices between the strands of stranded conductors shall be filled with a material designed to fill the interstices and to prevent the longitudinal migration of water that might enter the conductor. This material shall be compatible with the conductor and conductor shield materials. The surfaces of the strands that form the outer surface of the stranded conductor shall be free of the strand fill material. Compatibility of the strand fill material with the conductor shield shall be tested and shall be in compliance with ICEA T-32-645-93 (incorporated by reference in § 1728.97). Water penetration shall be tested and shall be in compliance with ANSI/ICEA T-31-

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610-2007 (incorporated by reference in § 1728.97).

(5) The center strand of stranded conductors shall be indented with the manufacturer's name and year of manufacture at regular intervals with no more than 12 inches (0.3 m) between repetitions.

(d) *Conductor shield (stress control layer)*. A non-conducting (for discharge resistant EPR) or semi-conducting shield (stress control layer) meeting the applicable requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) shall be extruded around the central conductor. The minimum thickness at any point shall be in accordance with ANSI/ICEA S-94-649-2004. The void and protrusion limits on the conductor shield shall be in compliance with ANSI/ICEA S-94-649-2004. The shield shall have a nominal operating temperature equal to, or higher than, that of the insulation.

(e) *Insulation*. (1) The insulation shall conform to the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) and may either be tree retardant cross-linked polyethylene (TR-XLPE) or ethylene propylene rubber (EPR), as specified by the borrower. The void and protrusion limits on the insulation shall be in compliance with ANSI/ICEA S-94-649-2004.

(2) The thickness of insulation shall be as follows:

ABLE RATED VOLTAGE

Cable rated voltage	Nominal thickness	Minimum thickness	Maximum thickness
15 kV	220 mils (5.59 mm)	210 mils (5.33 mm)	250 mils (6.35 mm).
25 kV	260 mils (6.60 mm)	245 mils (6.22 mm)	290 mils (7.37 mm).
35 kV	345 mils (8.76 mm)	330 mils (8.38 mm)	375 mils (9.53 mm).

(f) *Insulation shield*. (1) A semi-conducting thermosetting polymeric layer meeting the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) shall be extruded tightly over the insulation to serve as an electrostatic shield and protective covering. The shield compound shall be compatible with, but not necessarily the same material composition as, that of the insulation (e.g., cross-linked polyethylene shield may be used with EPR insulation). The void and protrusion

limits on the semi-conducting shields shall be in compliance with the ANSI/ICEA S-94-649-2004.

(2) The thickness of the extruded insulation shield shall be in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(3) The shield shall be applied such that all conducting material can be easily removed without the need for externally applied heat. Stripping tension values shall be 3 through 18 pounds (1.36 through 8.16 kg) for TR-XLPE and

EPR discharge free cables. Discharge resistant cables shall have strip tension of 0 through 18 pounds (0 through 8.16 kg).

(4) The insulation shield shall meet all applicable tests of ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(g) *Concentric neutral conductor.* (1) Concentric neutral conductor shall consist of annealed round, uncoated copper wires in accordance with ASTM B 3-01 (incorporated by reference in § 1728.97) and shall be spirally wound over the shielding with uniform and equal spacing between wires. The concentric neutral wires shall remain in continuous intimate contact with the extruded insulation shield. Full neutral is required for single phase and $\frac{1}{3}$ neutral for three phase applications unless otherwise specified. The minimum wire size for the concentric neutral is 16 AWG (1.32 mm²).

(2) When a strap neutral is specified by the borrower, the neutral shall consist of uncoated copper straps applied concentrically over the insulation shield with uniform and equal spacing between straps and shall remain in intimate contact with the underlying extruded insulation shield. The straps shall not have sharp edges. The thickness of the flat straps shall be not less than 20 mils (0.5 mm).

(h) *Overall outer jacket.* (1) An electrically nonconducting (insulating) or semi-conducting outer jacket shall be applied directly over the concentric neutral conductors.

(2) The jacket material shall fill the interstice area between conductors, leaving no voids. The jacket shall be free stripping. The jacket shall have three red stripes longitudinally extruded into the jacket surface 120° apart.

(3) Nonconducting jackets shall consist of low density, linear low density, medium density, or high density HMW black polyethylene (LDPE, LLDPE, MDPE, HDPE) compound meeting the requirements of ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) and ASTM D 1248-05 (incorporated by reference in § 1728.97) for Type I, Class C, Category 4 or 5, Grade J3 before application to the cable. Polyvinyl chloride (PVC) and chlorinated

polyethylene (CPE) jackets are not acceptable.

(4) Semi-conducting jackets shall have a maximum radial resistivity of 100 ohm-meter and a maximum moisture vapor transmission rate of 1.5 g/m²/24 hours at 38 °C (100 °F) and 90 percent relative humidity in accordance with ASTM E 96/E96M-05 (incorporated by reference in § 1728.97).

(5) The minimum thickness of the jacket over metallic neutral wires or straps shall comply with the thickness specified in ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(i) *Tests.* (1) As part of a request for Agency consideration for acceptance and listing, the manufacturer shall submit certified test data results to the Agency that detail full compliance with ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) for each cable design.

(i) Test results shall confirm compliance with each of the material tests, production sampling tests, tests on completed cable, and qualification tests included in ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(ii) The testing procedure and frequency of each test shall be in accordance with ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(iii) Certified test data results shall be submitted to the Agency for any test, which is designated by ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97) as being “for Engineering Information Only,” or any similar designation.

(2) *Partial discharge tests.* Manufacturers shall demonstrate that their cable is not adversely affected by excessive partial discharge. This demonstration shall be made by completing the procedures described in paragraphs (i)(2)(i) and (i)(2)(ii) of this section.

(i) Each shipping length of completed cable shall be tested and have certified test data results available indicating compliance with the partial discharge test requirements in ANSI/ICEA S-94-649-2004 (incorporated by reference in § 1728.97).

(ii) Manufacturers shall test production samples and have available certified test data results indicating compliance with ASTM D 2275–01 (incorporated by reference in §1728.97) for discharge resistance as specified in the ANSI/ICEA S–94–649–2004 (incorporated by reference in §1728.97). Samples of insulated cable shall be prepared by either removing the overlying extruded insulation shield material, or using insulated cable before the extruded insulation shield material is applied. The sample shall be mounted as described in ASTM D 2275–01 and shall be subjected to a voltage stress of 250 volts per mil of nominal insulation thickness. The sample shall support this voltage stress, and not show evidence of degradation on the surface of the insulation for a minimum of 100 hours. The test shall be performed at least once on each 50,000 feet (15,240 m) of cable produced, or major fractions thereof, or at least once per insulation extruder run.

(3) *Jacket tests.* Tests described in paragraph (i)(3)(i) of this section shall be performed on cable jackets from the same production sample as in paragraphs (i)(2)(i) and (i)(2)(ii) of this section.

(i) A Spark Test shall be performed on nonconducting jacketed cable in accordance with ANSI/ICEA S–94–649–2004 (incorporated by reference in §1728.97) on 100 percent of the completed cable prior to its being wound on shipping reels. The test voltage shall be 4.5 kV AC for cable diameters <1.5 inches and 7.0 kV for cable diameters >1.5 inches, and shall be applied between an electrode at the outer surface of the nonconducting (insulating) jacket and the concentric neutral for not less than 0.15 second.

(ii) [Reserved]

(4) Frequency of sample tests shall be in accordance with ANSI/ICEA S–94–649–2004 (incorporated by reference in §1728.97).

(5) If requested by the borrower, a certified copy of the results of all tests performed in accordance with this section shall be furnished by the manufacturer on all orders.

(j) *Miscellaneous.* (1) All cable provided under this specification shall have suitable markings on the outer

surface of the jacket at sequential intervals not exceeding 2 feet (0.61 m). The label shall indicate the name of the manufacturer, conductor size, type and thickness of insulation, center conductor material, voltage rating, year of manufacture, and jacket type. There shall be no more than 6 inches (0.15 m) of unmarked spacing between texts label sequence. The jacket shall be marked with the symbol required by Rule 350G of the National Electrical Safety Code and the borrower shall specify any markings required by local safety codes. This is in addition to extruded red stripes required in this section.

(2) Watertight seals shall be applied to all cable ends to prevent the entrance of moisture during transit or storage. Each end of the cable shall be firmly and properly secured to the reel.

(3) Cable shall be placed on shipping reels suitable for protecting it from damage during shipment and handling. Reels shall be covered with a suitable covering to help provide physical protection to the cable.

(4) A durable label shall be securely attached to each reel of cable. The label shall indicate the purchaser's name and address, purchase order number, cable description, reel number, feet of cable on the reel, tare and gross weight of the reel, and beginning and ending sequential footage numbers.

[77 FR 19529, Apr. 2, 2012]

PART 1730—ELECTRIC SYSTEM OPERATIONS AND MAINTENANCE

Subpart A—General

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